

SEQUENCE LISTING

<110> DNAVEC RESEARCH INC.

<120> PARAMYXOVIRAL VECTORS ENCODING ANTIBODIES, AND USES THEREOF

<130> D3-A0203P

<150> JP 2002-161964

<151> 2002-06-03

<160> 63

<170> PatentIn version 3.1

<210> 1

<211> 10

<212> DNA

<213> Sendai virus

<400> 1

ctttcaccct

10

<210> 2

<211> 15

<212> DNA

<213> Sendai virus

<400> 2

tttttcttac tacgg

15

<210> 3

<211> 18

<212> DNA

<213> Artificial

<220>

<223> Spacer sequence

<400> 3

cggccgcaga tcttcacg

18

<210> 4

<211> 18

<212> DNA

<213> Artificial

<220>

<223> an spacer sequence

<400> 4

atgcatgccg gcagatga

18

<210> 5

<211> 18

<212> DNA

<213> Artificial

<220>

<223> a primer for amplifying Sendai virus genome fragment

<400> 5

gttgagtact gcaagagc

18

<210> 6

<211> 42

<212> DNA

<213> Artificial

<220>

<223> a primer for amplifying Sendai virus genome fragment

<400> 6

tttgccggca tgcattttc ccaaggggag agttttgcaa cc

42

<210> 7

<211> 18

<212> DNA

<213> Artificial

<220>

<223> a primer for amplifying Sendai virus genome fragment

<400> 7

atgcatgccg gcagatga

18

<210> 8

<211> 21

<212> DNA

<213> Artificial

<220>

<223> a primer for amplifying Sendai virus genome fragment

<400> 8

tgggtgaatg agagaatcag c

21

<210> 9

<211> 1550

<212> DNA

<213> Artificial

<220>

<223> a gene framgment encoding V regions of antibody IN-1

<220>

<221> CDS

<222> (18).. (749)

<223>

<220>

<221> CDS

<222> (801).. (1505)

<223>

<400> 9

gcggccgccc tacggcc atg aaa aag aca gct atc gcg att gca gtg gca 50

Met Lys Lys Thr Ala Ile Ala Ile Ala Val Ala

1

5

10

ctg gct ggt ttc gct acc gta gcg cag gcc gaa gtt aaa ctg cat gag 98

Leu Ala Gly Phe Ala Thr Val Ala Gln Ala Glu Val Lys Leu His Glu

15	20	25	
tca ggg cct ggg ctg gta agg cct ggg act tca gtg aag ata tcc tgc			146
Ser Gly Pro Gly Leu Val Arg Pro Gly Thr Ser Val Lys Ile Ser Cys			
30	35	40	
aag gct tct ggc tac acc ttc act aac tac tgg cta ggt tgg gta aag			194
Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr Trp Leu Gly Trp Val Lys			
45	50	55	
cag agg cct gga cat gga ctt gag tgg att gga gat att tac cct gga			242
Gln Arg Pro Gly His Gly Leu Glu Trp Ile Gly Asp Ile Tyr Pro Gly			
60	65	70	75
ggt ggt tat act aac tac aat gag aag ttc aag ggc aag gcc aca ctg			290
Gly Gly Tyr Thr Asn Tyr Asn Glu Lys Phe Lys Gly Lys Ala Thr Leu			
80	85	90	
act gca gac aca tcc tcc agc act gcc tac atg cag ctc agt agc ctg			338
Thr Ala Asp Thr Ser Ser Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu			
95	100	105	
aca tct gag gac tct gct gtc tat ttc tgt gca aga ttt tac tac ggt			386
Thr Ser Glu Asp Ser Ala Val Tyr Phe Cys Ala Arg Phe Tyr Tyr Gly			
110	115	120	

agt agc tac tgg tac ttc gat gtc tgg ggc caa ggc acc acg gtc acc 434

Ser Ser Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Thr Val Thr

125

130

135

gtc tcc tca gca aag acc act cct ccg tct gtt tac cct ctg gct cct 482

Val Ser Ser Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro

140

145

150

155

ggt tct gcg gct cag act aac tct atg gtg act ctg gga tgc ctg gtc 530

Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val

160

165

170

aag ggc tat ttc cct gag cca gtg aca gtg acc tgg aac tct gga tcc 578

Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser

175

180

185

ctg tcc agc ggt gtg cac acc ttc cca gct gtc ctg caa tct gac ctc 626

Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu

190

195

200

tac act ctg agc agc tca gtg act gtc ccc tcc agc acc tgg ccc agc 674

Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser

205

210

215

gag acc gtc acc tgc aac gtt gcc cac ccg gct tct agc acc aaa gtt 722

Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val

220	225	230	235	
gac aag aaa atc gta ccg cgc gac tgc taaccgtagt aagaaaaact				769
Asp Lys Lys Ile Val Pro Arg Asp Cys				
240				
taggggtgaaa gttcatcgcg gccgtacggc c atg aaa caa agc act att gca				821
Met Lys Gln Ser Thr Ile Ala				
245 250				
ctg gca ctc tta ccg tta ctg ttt acc cct gtg aca aaa gcc gac atc				869
Leu Ala Leu Leu Pro Leu Leu Phe Thr Pro Val Thr Lys Ala Asp Ile				
255 260 265				
gag ctc acc cag tct cca gca atc atg gct gca tct gtg gga gaa act				917
Glu Leu Thr Gln Ser Pro Ala Ile Met Ala Ala Ser Val Gly Glu Thr				
270 275 280				
gtc acc atc aca tgt gga gca agt gag aat att tac ggt gct tta aat				965
Val Thr Ile Thr Cys Gly Ala Ser Glu Asn Ile Tyr Gly Ala Leu Asn				
285 290 295				
tgg tat cag cgg aaa cag gga aaa tct cct cag ctc ctg atc tat ggt				1013
Trp Tyr Gln Arg Lys Gln Gly Lys Ser Pro Gln Leu Leu Ile Tyr Gly				
300	305	310	315	

gca acc aac ttg gca gat ggc atg tca tcg agg ttc agt ggc agt gga 1061

Ala Thr Asn Leu Ala Asp Gly Met Ser Ser Arg Phe Ser Gly Ser Gly

320

325

330

tct ggt aga cag tat tct ctc aag atc agt agc ctg cat cct gac gat 1109

Ser Gly Arg Gln Tyr Ser Leu Lys Ile Ser Ser Leu His Pro Asp Asp

335

340

345

gtt gca acg tat tac tgt caa aat gtg tta agt act cct cgg acg ttc 1157

Val Ala Thr Tyr Tyr Cys Gln Asn Val Leu Ser Thr Pro Arg Thr Phe

350

355

360

gga gct ggg acc aag ctc gag ctg aag cgc gct gat gct gca ccg act 1205

Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg Ala Asp Ala Ala Pro Thr

365

370

375

gta tcc atc ttc cca cca tcc agt gag cag tta aca tct gga ggt gcc 1253

Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala

380

385

390

395

tca gtc gtg tgc ttc ttg aac aac ttc tac ccc aaa gac atc aat gtc 1301

Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val

400

405

410

aag tgg aag att gat ggc agt gaa cga caa aat ggc gtc ctg aac agt 1349

Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn Ser

415	420	425	
tgg act gat cag gac agc aaa gac agc acc tac agc atg agc agc acc Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr			1397
430	435	440	
ctc acg ttg acc aag gac gag tat gaa cga cat aac agc tat acc tgt Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys			1445
445	450	455	
gag gcc act cac aag aca tca act tca ccc att gtc aag agc ttc aac Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe Asn			1493
460	465	470	475
agg aat gag tgt tagtccgtag taagaaaaac ttagggtgaa agttcatgcg gccgc Arg Asn Glu Cys			1550

<210> 10

<211> 244

<212> PRT

<213> Artificial

<220>

<223> an immunoglobulin IN-1 heavy chain

<400> 10

Met Lys Lys Thr Ala Ile Ala Ile Ala Val Ala Leu Ala Gly Phe Ala

1 5 10 15

Thr Val Ala Gln Ala Glu Val Lys Leu His Glu Ser Gly Pro Gly Leu

20 25 30

Val Arg Pro Gly Thr Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr

35 40 45

Thr Phe Thr Asn Tyr Trp Leu Gly Trp Val Lys Gln Arg Pro Gly His

50 55 60

Gly Leu Glu Trp Ile Gly Asp Ile Tyr Pro Gly Gly Gly Tyr Thr Asn

65 70 75 80

Tyr Asn Glu Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Thr Ser

85 90 95

Ser Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser

100 105 110

Ala Val Tyr Phe Cys Ala Arg Phe Tyr Tyr Gly Ser Ser Tyr Trp Tyr

115 120 125

Phe Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Lys

130

135

140

Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln

145

150

155

160

Thr Asn Ser Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro

165

170

175

Glu Pro Val Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val

180

185

190

His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser

195

200

205

Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys

210

215

220

Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val

225

230

235

240

Pro Arg Asp Cys

<211> 235

<212> PRT

<213> Artificial

<220>

<223> an immunoglobulin IN-1 light chain

<400> 11

Met Lys Gln Ser Thr Ile Ala Leu Ala Leu Leu Pro Leu Leu Phe Thr

1 5 10 15

Pro Val Thr Lys Ala Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met

20 25 30

Ala Ala Ser Val Gly Glu Thr Val Thr Ile Thr Cys Gly Ala Ser Glu

35 40 45

Asn Ile Tyr Gly Ala Leu Asn Trp Tyr Gln Arg Lys Gln Gly Lys Ser

50 55 60

Pro Gln Leu Leu Ile Tyr Gly Ala Thr Asn Leu Ala Asp Gly Met Ser

65 70 75 80

Ser Arg Phe Ser Gly Ser Gly Ser Gly Arg Gln Tyr Ser Leu Lys Ile

85 90 95

Ser Ser Leu His Pro Asp Asp Val Ala Thr Tyr Tyr Cys Gln Asn Val

100

105

110

Leu Ser Thr Pro Arg Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys

115

120

125

Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu

130

135

140

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe

145

150

155

160

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg

165

170

175

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser

180

185

190

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu

195

200

205

Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser

210

215

220

Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys

225

230

235

<210> 12

<211> 68

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 12

cggaattcgc ggccgccgta cggccatgaa aaagacagct atcgcgattg cagtggcact 60

ggctggtt 68

<210> 13

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 13

tgcagtggca ctggctggtt tcgctaccgt agcgcaggcc gaagttaaac tgcatagagtc 60

agggcctggg

70

<210> 14

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 14

tgcatgagtc agggcctggg ctggtaaggc ctgggacttc agtgaagata tcctgcaagg 60

cttctggcta

70

<210> 15

<211> 60

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 15

actgcagaca catcctccag cactgcctac atgcagctca gtagcctgac atctgaggac 60

<210> 16

<211> 60

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 16

gtagcctgac atctgaggac tctgctgtct atttctgtgc aagattttac tacggtagta 60

<210> 17

<211> 60

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 17

aagattttac tacggtagta gctactggta cttcgatgtc tggggccaag gcaccacggt 60

<210> 18

<211> 60

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 18

cgggatccct gtccagcgggt gtgcacacct tcccagctgt cctgcaatct gacctctaca 60

<210> 19

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 19

cctgcaatct gacctctaca ctctgagcag ctccagtact gtcccctcca gcacctggcc 60

cagcgagacc

70

<210> 20

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 20

gcacctggcc cagcgagacc gtcacctgca acgttgccca cccggcttct agcaccaaag 60

ttgacaagaa 70

<210> 21

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 21

gccgacatcg agtcaccca gtctccagca atcatggctg catctgtggg agaaactgtc 60

accatcacat

70

<210> 22

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 22

agaaactgtc accatcacat gtggagcaag tgagaatatt tacggtgctt taaattggta 60

tcagcggaaa

70

<210> 23

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 23

taaattggta tcagcggaaa cagggaataat ctcctcagct cctgatctat ggtgcaacca 60

acttggcaga 70

<210> 24

<211> 72

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 24

accgctcgag ctgaagcgcg ctgatgctgc accgactgta tccatcttcc caccatccag 60

tgagcagtta ac 72

<210> 25

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 25

ccatccagtg agcagttaac atctggaggt gcctcagtcg tgtgcttctt gaacaacttc 60

taccccaaag 70

<210> 26

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 26

gaacaacttc taccccaaag acatcaatgt caagtggaag attgatggca gtgaacgaca 60

aaatggcgtc 70

<210> 27

<211> 79

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 27

caagagcttc aacaggaatg agtgtagtc cgtagtaaga aaaacttagg gtgaaagttc 60

atgcggccgc aagcttggg 79

<210> 28

<211> 80

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 28

tgaacgacat aacagctata cctgtgaggc cactcacaag acatcaactt cacccattgt 60

caagagcttc aacaggaatg 80

<210> 29

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 29

gacagcacct acagcatgag cagcaccctc acgttgacca aggacgagta tgaacgacat 60

aacagctata 70

<210> 30

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 30

gtgaacgaca aaatggcgtc ctgaacagtt ggactgatca ggacagcaaa gacagcacct 60

acagcatgag 70

<210> 31

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 31

ttactgtcaa aatgtgttaa gtactcctcg gacgttcgga gctgggacca agctcgagcg 60

gaagcttggg 70

<210> 32

<211> 80

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 32

atctggtaga cagtattctc tcaagatcag tagcctgcat cctgacgatg ttgcaacgta 60

ttactgtcaa aatgtgttaa 80

<210> 33

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 33

ggtgcaacca acttggcaga tggcatgtca tcgaggttca gtggcagtgg atctggtaga 60

cagtattctc 70

<210> 34

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 34

gcactattgc actggcactc ttaccgttac tgtttaccoc tgtagacaaa gccgacatcg 60

agctcaccca

70

<210> 35

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 35

agaaaaactt agggtgaaag ttcacgcgg ccgtacggcc atgaaacaaa gcactattgc 60

actggcactc

70

<210> 36

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 36

agcaccaaag ttgacaagaa aatcgtagcg cgcgactgct aaccgtagta agaaaaactt 60

agggtgaaag 70

<210> 37

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 37

tgactctggg atgcctgggc aagggtatt tccctgagcc agtgacagtg acctggaact 60

ctggatcccg 70

<210> 38

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 38

gtctgtttac cctctggctc ctggttctgc ggctcagact aactctatgg tgactctggg 60

atgcctggtc 70

<210> 39

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 39

tggggccaag gcaccacggt caccgtctcc tcagcaaaga ccactcctcc gtctgtttac 60

cctctggctc 70

<210> 40

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 40

gaggtggtta tactaactac aatgagaagt tcaagggcaa ggccacactg actgcagaca 60

catcctccag 70

<210> 41

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 41

aaagcagagg cctggacatg gacttgagtg gattggagat atttaccctg gaggtggtta 60

tactaactac 70

<210> 42

<211> 70

<212> DNA

<213> Artificial

<220>

<223> a synthetic oligonucleotide for constructing a Fab gene fragment

<400> 42

tcttgcaagg cttctggcta caccttcact aactactggc taggttgggt aaagcagagg 60

cctggacatg 70

<210> 43

<211> 753

<212> DNA

<213> Artificial

<220>

<223> an anti-CD28 ScFv antibody gene (SYN205-13)

<400> 43

tctagagaca tcgagctcac tcagtctcca gcttcttttg ctgtgtctct agggcagaga 60

gccaccatct cctgcagagc cagtgcagagt gttgaatatt atgtcacaag tttaatgcag 120

tggtaccagc agaagccagg acagccaccc aaactcctca tctttgctgc atccaacgta 180

gaatctgggg tccctgccag gtttagtggc agtgggtctg ggacaaactt cagcctcaac 240
 atccatcctg tggacgagga tgatgttgca atgtatttct gtcagcaaag taggaaggtt 300
 ccttacacgt tggagggggg gaccaagctg gaaataaaac ggggaggcgg cggttctggc 360
 ggtggcggat caggtggcgg aggctcgcag gtgaaactgc agcagtctgg acctggcctg 420
 gtgacgcct cacagagcct gtccatcact tgtactgtct ctgggttttc attaagcgac 480
 tatggtgttc actgggttcg ccagtctcca ggacaggac tggagtggct gggagtaata 540
 tgggctggtg gaggcacgaa ttataattcg gctctcatgt ccagaaagag catcagcaaa 600
 gacaactcca agagccaagt tttcttaaaa atgaacagtc tgcaagctga tgacacagcc 660
 gtgtattact gtgccagaga taagggatac tcctattact attctatgga ctactggggc 720
 caagggacca cggtcactgt ctctctgtct aga 753

<210> 44

<211> 247

<212> PRT

<213> Artificial

<220>

<223> an anti-CD28 ScFv fragment encoded by SYN205-13

<400> 44

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly

1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser Val Glu Tyr Tyr

20 25 30

Val Thr Ser Leu Met Gln Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro

35 40 45

Lys Leu Leu Ile Phe Ala Ala Ser Asn Val Glu Ser Gly Val Pro Ala

50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asn Phe Ser Leu Asn Ile His

65 70 75 80

Pro Val Asp Glu Asp Asp Val Ala Met Tyr Phe Cys Gln Gln Ser Arg

85 90 95

Lys Val Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg

100 105 110

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gln

115

120

125

Val Lys Leu Gln Gln Ser Gly Pro Gly Leu Val Thr Pro Ser Gln Ser

130

135

140

Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Asp Tyr Gly

145

150

155

160

Val His Trp Val Arg Gln Ser Pro Gly Gln Gly Leu Glu Trp Leu Gly

165

170

175

Val Ile Trp Ala Gly Gly Gly Thr Asn Tyr Asn Ser Ala Leu Met Ser

180

185

190

Arg Lys Ser Ile Ser Lys Asp Asn Ser Lys Ser Gln Val Phe Leu Lys

195

200

205

Met Asn Ser Leu Gln Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg

210

215

220

Asp Lys Gly Tyr Ser Tyr Tyr Tyr Ser Met Asp Tyr Trp Gly Gln Gly

225

230

235

240

Thr Thr Val Thr Val Ser Ser

245

<210> 45

<211> 131

<212> DNA

<213> Artificial

<220>

<223> a NotI fragmnet containing an EIS sequence in pGEM-4Zcst

<400> 45

gcggccgccca aagttcaatg gattttcagg tgcagatttt cagcttcctg ctaatcagtg 60

cctcagtcac aatgtccaga ggatctagac cgtagtaaga aaaacttagg gtgaaagttc 120

atcgcgcccg c 131

<210> 46

<211> 22

<212> PRT

<213> Mus musculus

<400> 46

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser

1 5 10 15

Val Ile Met Ser Arg Gly

20

<210> 47

<211> 70

<212> DNA

<213> Artificial

<220>

<223> an synthetic oligonucleotide for constructing an anti-CD28cst
gene fragment

<400> 47

tctagagaca tcgagctcac tcagtctcca gcttctttgg ctgtgtctct agggcagaga 60

gccaccatct 70

<210> 48

<211> 70

<212> DNA

<213> Artificial

<220>

<223> an synthetic oligonucleotide for constructing an anti-CD28cst
gene fragment

<400> 48

agggcagaga gccaccatct cctgcagagc cagtgagagt gttgaatatt atgtcacaag 60

tttaatgcag 70

<210> 49

<211> 70

<212> DNA

<213> Artificial

<220>

<223> an synthetic oligonucleotide for constructing an anti-CD28cst
gene fragment

<400> 49

atgtcacaag tttaatgcag tggtaccagc agaagccagg acagccaccc aaactcctca 60

tctttgctgc 70

<210> 50

<211> 70

<212> DNA

<213> Artificial

<220>

<223> an synthetic oligonucleotide for constructing an anti-CD28cst
gene fragment

<400> 50

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ggtggcggat 70

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<210> 53

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<211> 70

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tggagactgg 70

<210> 58

<211> 70

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gene fragment

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tcctcgtcca 70

<210> 60

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gccactaaac 70

<210> 61

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tgaggagttt 70

<210> 62

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<223> a synthetic primer R199

<400> 63

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23